FAA AVIATION NEWS

MARCH 1971

COVER

Unexpected wire crossings are the airman's ancient Nemesis. For a new light on the problem, see p. 4.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION   VOL. 9, NO. 10

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John A. Volpe, *Secretary of Transportation*

John H. Shaffer, *Administrator, FAA*

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FAA AVIATION NEWS is published by the Office of Public Affairs, PA-20, Federal Aviation Administration, Washington, D. C. 20590, in the interest of aviation safety and to acquaint readers with the policies and programs of the agency. The use of funds for printing FAA AVIATION NEWS was approved by the Director of the Bureau of the Budget, July 14, 1967. Single copies of FAA AVIATION NEWS may be purchased from the Superintendent of Documents for 20 cents each. All printed materials contained herein are advisory or informational in nature and should not be construed as having any regulatory effect. The FAA does not officially endorse any goods, services, materials, or products of manufacturers.

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Washington Pipeline

FAA Administrator John H. Shaffer begins his workday by studying a bulletin prepared for him reporting any problems that have occurred throughout the national airspace system the night before, or over the weekend. These "problems" include accident reports, especially depressing on Monday mornings or after holidays, when the bulletin is almost certain to report several general aviation fatalities.

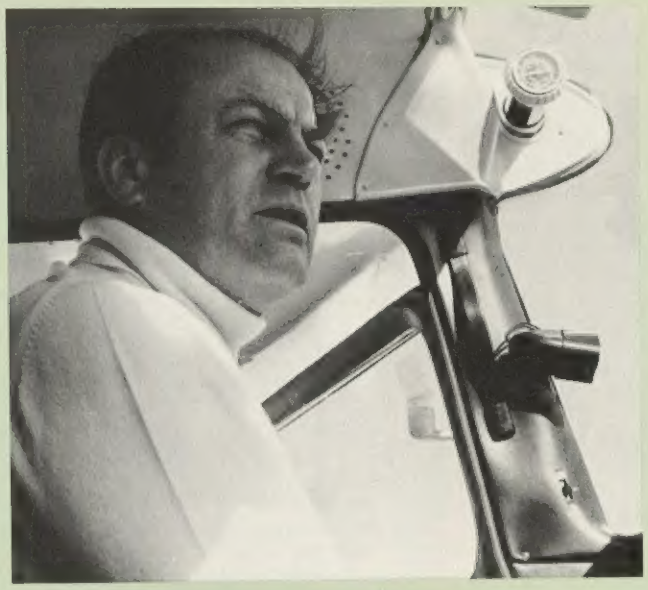
". . . four fatal when light twin strikes mountainside in overcast . . . doctor and two companions killed when lost in snowstorm near ski area . . . aircraft destroyed, two seriously injured after impact with wires. . . ."

A typical week's summary shows about 70 inflight assists rendered by FAA's Air Traffic Service, most of which involve lost or disoriented pilots. Critical fuel shortages and encounters with IFR weather by VFR pilots are also common.

In an effort to reduce the 1970 year-end holiday toll, Mr. Shaffer sent out a letter to all pilots on November 3, 1970, calling attention to the number of preventable accidents that are still occurring, notwithstanding the steadily improving ratio of accidents based on aircraft usage (see p. 14). The Administrator mentioned the recently updated FAA advisory circular on "Cold Weather Operation of Aircraft" (AC-91-13A) as an aid to grappling with winter flying hazards, and invited airmen to send in their suggestions for reducing accidents.

Within the space of a few weeks nearly 4,000 replies had arrived at FAA headquarters in Washington, containing many constructive and imaginative suggestions, as well as some criticism. Quite a number of pilots felt that flight service stations should assume a more decisive role in advising pilots whether to proceed with a flight or not, or how best to go about it. One pilot complained of 113 rings of the phone before his call to a FSS (on Thanksgiving Day) was answered. All suggestions are being studied and responded to by experts in FAA headquarters.

Response to the Administrator's letter also indicated a general unfamiliarity with FAA advisory circulars and the means of obtaining them. The following dialogue provides answers to the most frequently asked questions about ACs:



Steady flow of advisory circulars from FAA headquarters reflect the Administrator's concern for the well-being of aviation and aviators.

Q. WHAT ARE ADVISORY CIRCULARS?

A. They are circulars of a strictly advisory nature, either leaflets or pamphlets, issued by FAA from time to time to inform the aviation community about hazards to flight, problems of operation, and other matters of interest to safer flying and the well-being of aviation. Subjects vary widely. ACs are not enforceable, unless subsequently incorporated into a regulation.

Q. WHERE CAN A LIST OF AVAILABLE CIRCULARS BE FOUND?

A. An Advisory Circular Checklist, issued three times a year, describes all current circulars and also includes information on the status of FARs. This checklist is listed as AC 00-2, and is available free on request from the DOT Distribution Unit. A catalog of publications, issued by FAA's Office of Public Affairs, gives a partial listing of the most commonly desired circulars. Also free on request from the DOT Distribution Unit.

Q. IS THERE A CHARGE FOR ACs?

A. Some ACs are for sale (they will have a price listed after the description on the checklist). All others are distributed free.

Q. HOW CAN ADVISORY CIRCULARS BE PURCHASED?

A. Those for sale may be ordered from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Enclose check or money order, give the exact title and the catalog number which follows the list price.

Q. HOW CAN FREE ADVISORY CIRCULARS BE OBTAINED?

A. Write to Department of Transportation Distribution Unit, TAD 484.3, Washington, D.C. 20590. Give exact title and number. Example: *Flight Test Guide, Private and Commercial Pilot, AC 61-39.*

Q. HOW CAN ONE GET ON THE MAILING LIST FOR FUTURE ADVISORY CIRCULARS?

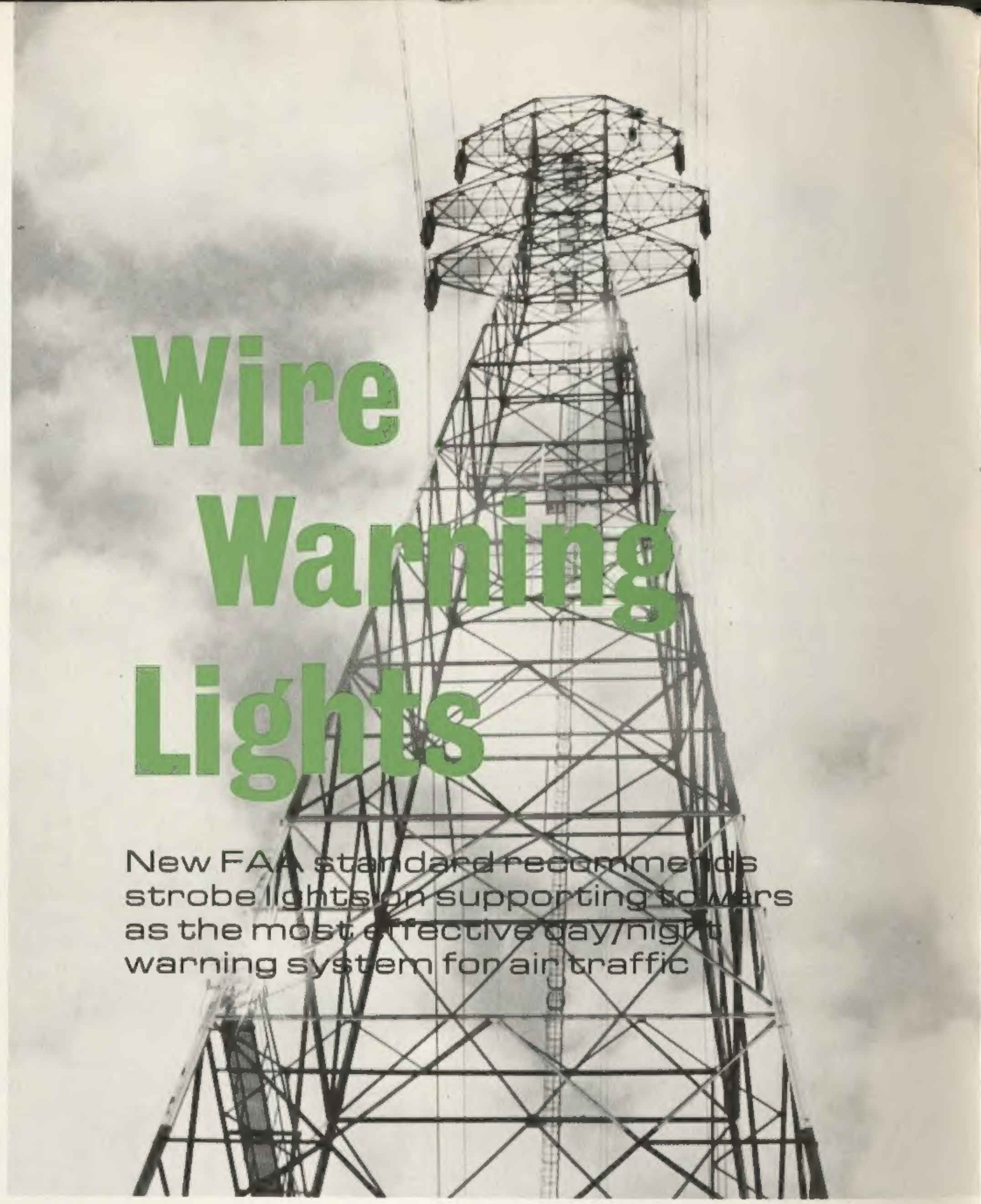
A. Advisory circular are grouped according to subject area. Each group is assigned a number; mailing lists correspond to the group number, as follows:

- 00 General
- 10 Procedural
- 20 Aircraft
- 60 Airmen
- 70 Airspace
- 90 Air Traffic Control & General Operations
- 120 Air Carrier, Commercial Operators and Helicopters
- 140 Schools and Other Certified Agencies
- 150 Airports
- 170 Air Navigational Facilities
- 180 Administrative
- 210 Flight Information

The second part of the number (as in AC 61-39) identifies the individual circular. Revisions are indicated by a letter, A, B, etc. following the number. The original date of issue is shown on the checklist.

To have your name placed on a mailing list, write to the DOT Distribution Unit and indicate by number and subject the list(s) of your interest. Since the contents of some circulars overlap subject areas, persons on more than one mailing list may receive more than one copy of a given circular.

Advisory circulars are not guaranteed to keep everyone out of trouble or solve all problems in aviation, but they do serve a very useful reference purpose. They are also a reminder to the flying community that someone in Washington has its best interests at heart. Requests for new ACs on pertinent subjects of common concern will be given careful consideration by the Administrator. ■



Wire Warning Lights

New FAA standard recommends strobe lights on supporting towers as the most effective day/night warning system for air traffic

Where the Mississippi River approaches New Orleans and prepares to meet the sea, the river is over 4,000 feet across. Within 20 miles of the city and its two close-in airports (Moisant and Lakefront) there are at least half a dozen transmission wire crossings over 400 feet high. In the wintertime particularly, the morning fog that rolls in over the delta renders the spherical markers on the wires and the red lights on the towers all but invisible. The New Orleans area probably has more of these wire crossing obstructions to air navigation per square mile than any other in the country. The nation-wide annual toll of accidents associated with transmission wires or poles is considerable. The last year for which we have complete figures, 1968, showed 158 accidents, 66 persons fatally or seriously injured, and 158 aircraft substantially damaged or totally destroyed.

(Pilot performance and engine malfunction played a significant role in these accidents, along with visibility problems.)

At New Orleans a year-long joint effort involving FAA and the Edison Electrical Institute (representing most of the nation's municipal power suppliers) has set the stage for issuance of a new FAA marking standard for high transmission lines and towers in the vicinity of airports.

For many years the common marking for wires has been spherical balls strung along the wires at regular intervals, with red warning lights on the supporting towers. The spherical balls (unlighted) are visible only in daytime and in good weather; at night or in IFR conditions they are of little help to the unsuspecting pilot. Consequently, in 1950, in conjunction with the Bonneville Power Administration, FAA tried out a system using red lights strung along the transmission wires.

This helped a good deal at night, but the system proved to be quite impractical. The presence of lights hanging from the transmission lines brought about excessive vibration during windy weather, causing frequent interruption to power service. Furthermore, the only practical light available for long-span transmission lines was a low intensity neon type which was quite unsatisfactory as a daytime warning device for pilots.

Spherical markers on upper wires are just barely visible against cloud cover and invisible at night. Protecting markers against weathering and discoloration is difficult.

The new standard now being adopted by FAA had its beginning in August 1968, when the Bonneville Power Administration and FAA successfully tested the practicality of high intensity strobe lights on two BPA towers supporting wires across the Columbia River near Portland, Oregon. Six months later, FAA and the Edison Electric Institute jointly agreed to have the system demonstrated and tested in New Orleans by two EEI members, New Orleans Public Services, Inc., and the Louisiana Power and Light Co.

After a preliminary look at the possibilities of installing floodlights on the support towers, with unsatisfactory results, the two companies acquired new high intensity strobe lights through EEI and installed them on two 460-foot (above ground) towers carrying high voltage lines across the Mississippi at the Ninemile-Carrolton crossing, just outside of downtown New Orleans.

The system which finally evolved as most satisfactory consists of three banks of white, high intensity flashing lights on each tower. The top light is installed on top of the tower, the bottom light is located near the average height above water of the lowest point of the wires, and the middle light is about midway between the other two lights. The lights flash white at 60 flashes per minute in the following sequence: the middle light flashes first, the top second and the bottom light third. The "off" interval between the second and third lights is about twice the interval between the first two lights. The interval between the end of one sequence and the beginning of the next is about ten times as long as the interval between the first and second lights. The sequences on the two towers are not simultaneous. The "on" time of any flash is normally about 20 microseconds.

Each light is made up of two 120° lamp

Wire warning lights on supporting towers are easily accessible for maintenance. At this crossing of the Mississippi River near New Orleans the wires reach up to 450 feet. The warning lights, shown as individual flashes by the camera, are perceived as a bright three-light sequence by the human eye. Time exposure (below) shows the relative position of the lights on the towers. Light beam is directed above the horizon to avoid glare on river.

assemblies at each level, producing a 180° horizontal distribution, with the 60° overlap centered on the transmission lines. Peak lighting intensity during the daytime is in the order of 100,000 candelas; at night, intensity is reduced to 500 to 1,000 candelas. The light beam is shielded and tilted above the horizon in order to prevent glare from disturbing river traffic, and the people on the ground.

Operated continuously for over a year now, the lighting system has elicited only favorable comments from pilots in the area, who were advised of the test installation by NOTAM. The two 460-foot towers are located approximately six nautical miles east-south-east of New Orleans (Moisant) International Airport and eight nautical miles southwest of Lakefront Airport, but neither airport has reported any pilot difficulty on approach or takeoff associated with the flashing lights.

In general, the poorer the visibility at the Ninemile Crossing, the more conspicuous the light system appears—in contrast to unlighted markers, which tend to fade out of sight in poor visibility. The limited (180°) horizontal arc of the lights enables pilots aloft to establish the position of the invisible transmission lines quickly and accurately, and to avoid them easily.

Success of the new system is due in part to the recent industrial development of extremely high intensity lights in the order of 100,000 candelas and above. Although an intensity as low as 20,000 candelas is considered adequate by the U.S. Bureau of Standards for being seen within one mile, on a day when the meteorological visibility is one mile or better, FAA's Air Traffic Service intends to use 100,000 candelas as the standard, based on test results to date.

O. K. Haley, chief of the New Orleans GADO which has monitored the test installation carefully, reports that the warning flashes are least likely to attract attention on days of brilliant sunshine. These, of course, are not the kind of weather or visibility conditions that normally produce wire accidents. Once pilots become familiar with the idea that warning devices of transmission lines are not to be found on the lines themselves, but *on the adjacent towers,* pilots should have little difficulty in identifying the flashing white lights at a considerable distance.

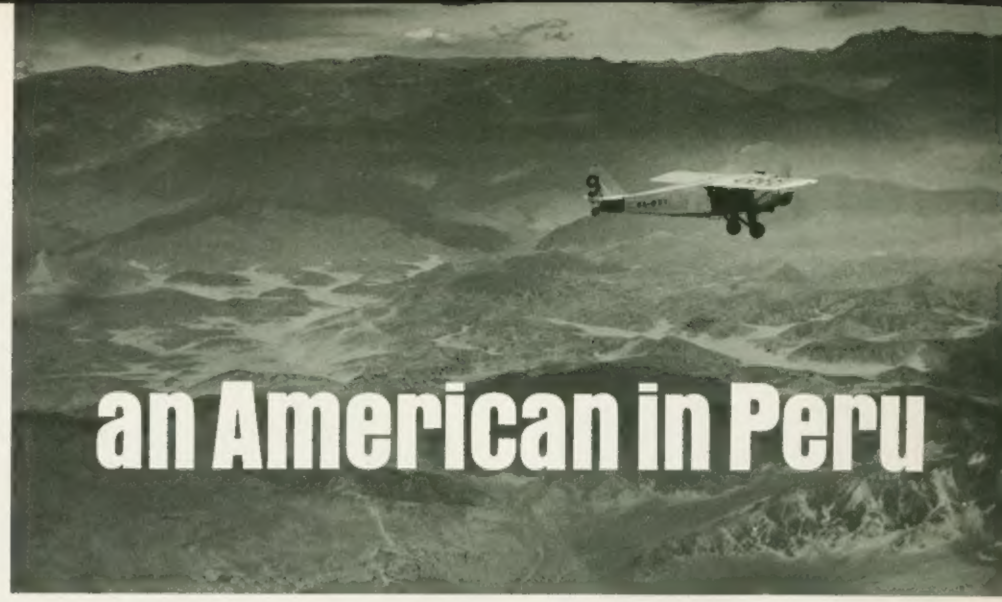
Only minor maintenance on the lights was required during the trial year, according to the New Orleans Public Service and the Louisiana Power and Light Company, whose engineers have been keeping a close eye on the experimental system. Leonard A. Ramon, Jr., who has represented the Edison Electrical Institute in this joint industry/government undertaking, feels that member companies all over the nation will follow suit in protecting the navigable airspace and the power lines by installing flashing lights on transmission towers near airports, once FAA's standard is officially published. Although the expense of the new system, which is borne entirely by industry, will be high, the power companies are willing to do their share in reducing the possibility of aircraft colliding with wires.

In each locality where the new system is installed, pilots will be informed by NOTAM and through contact with flight service stations and GADOs. The number of lights on each tower may be increased if the towers are higher than 500 feet, and reduced if the towers are shorter than 200 feet. Although spherical markers and red obstruction lights may be removed wherever white flashing lights are installed, the former warning devices will continue in use in some areas near airports or low-flying aerial activity.

The next installation of the new wire crossing marking system with strobe lights will be at Hopewell, Va., southwest of Richmond, at a James River crossing maintained by the Virginia Electric Power Co. It will be operative by late spring of 1971. ■

City background makes 460-foot tower difficult to distinguish without high intensity light shown on tower top. Daytime intensity is 100,000 candelas, reduced to 10,000 at night.

Famous
FLYERS



an American in Peru

A self-taught Yankee pilot first pierced the Andean barrier to open up the Amazon to air commerce.

Elmer J. Faucett,
Mr. Aviation of Peru

A lone biplane buzzes across the open sky, a tiny orange and yellow speck in the blue vault. Its shadow races along far below, dancing over the jagged mountains.

Clutching the stick between his knees in the open cockpit, the pilot uses a free hand to wipe oil spatterings from his goggles, as he squints down at the crude, uncertain map of the Peruvian Andes spread across his knees.

Great, rocky, snow-capped peaks nearly 20,000 feet high thrust their way into the sky on both sides of the bouncing plane. Ahead is an almost unbroken ridge at an altitude far above the operating ceiling of the little Curtiss *Oriole*. The pilot scans the crags as he tries to decide on the most likely pass through the mountains. He chooses one, and drives toward it, knowing it may be a blind canyon or too narrow for passage. It may also be home for furious winds too violent for the small craft to cope with.

Luckily he makes it through the pass. Ahead lies an endless green-black maze of jungle. An emergency landing is devoutly to be avoided. Even if he could find a place to put down safely, the nearest village might be 50 miles away, through unfamiliar jungle inhabited by little-known terrors of nature, like the bushmaster, one of the deadliest snakes in the world. A rescue team would take weeks to reach a downed pilot here, assuming they knew where to look.

The intense cold sweeps through his bulky clothing. Though he dog-legs around the thunderheads, he pokes through lesser clouds, ignoring the turbulence and the rain that soaks into the cockpit and runs in rivulets past his collar and down his back.

He has no radio, no parachute, only primitive navigation instruments, and a map based mostly on guess and rumor. Soon nightfall and weariness conspire to bring about a forced landing in the Amazon jungle 60 miles short of his goal.

It all really happened back in 1922, and even in that day of hell-for-leather pilots, not many men would have dared such a flight. The man who did was the pioneer aviator Elmer J. Faucett—a gregarious, barrel-chested six-footer whose nickname "Slim" belied his build.

A Farmhand from Savona

Faucett was an American, a pioneer flyer of the open cockpit, and a national hero in Peru who remains almost unknown in his native land. Born in 1891 on a farm at Savona, upstate New York, he grew up in that era when newspapers and the public in every country laughed at those lunatic inventors who thought they could fly. He was still a teenager when he got into aviation himself.

The Glenn H. Curtiss Manufacturing Company was located in Hammondsport, New York—only 10 miles from young Faucett's home. At age 19 he had learned enough about machinery around the farm to talk Curtiss into hiring him as a fledgling aircraft mechanic.

With the outbreak of W.W. I, Faucett put away his mechanic's tools and shipped out in the ranks of General Pershing's expeditionary forces, hoping for a flying assignment. The Army perversely packed him back to the States and returned him, still in uniform, to his old civilian job at the Curtiss plant.

Shortly after the war ended, Faucett went to the Curtiss plant at Roosevelt Field, New York, to take charge of service and maintenance. There his frustration at not being allowed to fly during the war led him into trouble, and very nearly ended his career in aviation.

A new Jenny had arrived from the Curtiss factory. Faucett uncrated and assembled it. He had the plane warmed up and waiting for a test flight when the pilot called in sick. Faucett climbed into the cockpit intending (he swore) to taxi the plane back to the hangar, but the combination of a brand-new airplane, his own desire, and months of frustration proved too much. He raced the aircraft to the runway and took off with estatic glee.

That first solo lasted 15 glorious minutes. After he had managed a tolerable first-time landing, his enraged boss came rushing up to inform Faucett that he was fired.

As he was packing his gear, company headquarters called, unaware that Faucett had just been sacked. They had a new assignment to offer him: would he like to accompany a shipment of planes to Peru? Indeed he would!

Faucett arrived at Lima by ship in June of 1920. The streets were alive with throngs of strollers including colorfully dressed Indians, some with babies nonchalantly slung behind them. Youngsters attended classes in the echoing lecture halls of a university founded by authority of the Spanish king

in 1551. And in a magnificent ancient cathedral, the mummified remains of the explorer Pizarro lay open to public view.

A fascinating country for the tourist, Peru was formidable challenge to the aviator. Side by side in an area twice as big as Texas was a Sahara-like desert, mountains higher than the Alps of Europe, and a dense, thinly populated jungle. Lima, the capital, was situated on the narrow, 1400-mile strip of Pacific coastline where rain almost never falls. The coastal desert was blocked off from the interior by the towering Andes range, with an average altitude of 13,000 feet. Beyond, more than half the land area of Peru lay in a vast underdeveloped territory of inhospitable jungle, where some of the Indians still worshipped the gods of their Inca forefathers and cannibalism was not unknown.

A geography like that made communications with the interior nearly impossible. No reasonable man would even think of trying to carve out a road or lay a rail line through such jungle, or over such jagged peaks. Even the airplane offered little hope. The wood and fabric machines of the day had neither the range nor the altitude for safe flying into the interior.

In Lima, Slim Faucett assembled the new planes he had escorted to Peru, taking time off occasionally for some self-instructed flying.

Soon he had enough confidence to hire himself out as a qualified pilot. His work varied—flying doctors into remote mountain towns, flying a payroll to a mining crew, or ferrying a nun or priest to a mission in an Indian village. Rarely was a job turned down—unless it involved flying too far eastward into the forbidding mountains. Many of the Andean peaks were not even accurately depicted on the maps, and some were so towering that there was not an airplane made that could fly over them.

But one day the Government of Peru offered a cash prize to the first man who would take an airplane 650 miles across the Andes to Iquitos, a town in northeastern Peru, in the mountainous jungle at the headwaters of the Amazon. It was Faucett's big chance to make a stake in aviation.

From its humble origin as a one-man one-plane air service, "Aviation Faucett" has grown into a major South American airline, with modern jets replacing the homemade **Chicos** built specially for rough country operations by Faucett. The American from Savona is credited with overcoming mountain barriers that had separated eastern and western Peruvian commerce.

He borrowed a Curtiss *Oriole* from a wealthy American contractor working in Peru and took off from a racetrack near Lima one fine morning in October 1922.

Faucett headed north along the coast, landed to refuel at Chiclayo, and from there headed east toward the grey, somber Andean peaks, probing through ominous clouds for a passage to the east low enough to fly through. With luck and daring he penetrated the Andean wall.

The worst was behind him now, but where, exactly was Iquitos? He was on top of a solid overcast and taking a heavy buffeting from strong winds that must surely have blown him off course.

Wet and chilled, tired from fighting the mountain turbulence, Slim decided there was nothing to do but poke down through the clouds hoping to see the ground before he ran into it or out of fuel.

Down in the Amazon

He broke out over a dark, fast-flowing river closed in on both sides by jungle growing right up to the banks—the headwaters of the Amazon! The only landing spot, possibly for miles, was a sand bar in the middle of the river and that looked none too solid. He cross-controlled into a steep side-slip, let the airspeed drop to just above stall, touched down—and hit a soft spot, flipping the plane up on her nose.

Faucett climbed out, weary and relieved, but uninjured. The only damage from the landing accident, he discovered, was a shattered prop. He had landed 60 miles upstream from Iquitos; a passing launch gave him a ride to the town, where a tumultuous welcome awaited him—but no money.

The rules for winning the prize stipulated that *the flight had to terminate at Iquitos.*

Faucett had to wait three months for a new prop to arrive from Lima. And then, trying to get off the sand bar, he groundlooped. He heard the crunch and tearing of wood, and could hardly bear to look. The brand new propellor was shredded.

Back went the order to Lima for yet another prop. Meanwhile all he could do was wait impatiently, look at the jungle sky, and listen apprehensively for the drone of an airplane that would mean some other pilot had successfully flown the mountains, snatching the prize out of his hands.

Finally a boat arrived with the second new prop, and on May 9, seven long months after that October day he had lifted off the racetrack at Lima, Slim Faucett took off from the sand bar, flew the final leg and landed safely at Iquitos.

With his winnings, Faucett started a small air-charter service. Before long the Yanqui pilot's bright orange and yellow biplane had become a familiar sight over the villages and towns of Peru. On a typical flight Faucett would take off from Lima at three in the morning, unload a cargo of gear around mid-day at a mining camp in the Andes, and be back in Lima by seven o'clock the same night.

The operation was largely makeshift. There were no airstrips at many of the places Faucett flew to, so the standard procedure called for a low pass to scare away cattle before coming in for a landing at some village pasture.

By 1928, the one-plane charter service had become the *Compania Aviation Faucett,* a scheduled airline. He acquired two four-place Stinson *Detroiters,* single engine fabric-covered aircraft powered by 220 hp J-5 engines. Faucett turned out to be as able at administration as he was at flying. Under his hand, the company soared into the kind of overnight success that makes an investor smile in his sleep.

Faucett built a new airport and opened a school to train Peruvians in maintenance and service. He hired other local people for administration and management jobs. In time, even some of the flying was being done by Peruvians—a source of considerable national pride.

In the 1930s, U.S. manufacturers started turning out all-metal, twin-engine aircraft, fine for the mostly flat, open country of North America, but of little use in vertical Peru, with its pocket-size, unpaved strips.

Slim Faucett's approach to the problem was characteristic. He conceived his own airplane, adapting recent advances in airframes to the conditions of Peru. He had the plane built in his own company workshops, by local workmen he had trained himself. Then he personally took the plane up on its first test flight.

The Peruvians affectionately called Slim's plane *El Chico*—the Little One. And she was little, with stubby wings and a 60 mph stall speed so she could drop down into small, rough fields. The single engine was a 550 hp geared Hornet, and that was enough to carry six passengers or two tons of payload at a cruise speed of 140 mph.

The high-wing, fixed-gear *Chicos* with their bright orange paint jobs were the first aircraft ever built in Latin America. They were soon setting altitude and distance records that made Peru a leader in South American aviation.

A grateful Peruvian government awarded Faucett its highest decoration, the Order of the Sun, and created a special medal for him. The road leading from Lima to its modern international airport was named "Avenida Elmer J. Faucett."

Elmer Faucett died in Lima on April 10, 1960, at the age of 69. His airline had grown from a one man charter service to the largest domestic air transport company in Peru, with modern jets that fly high over that fateful pass in the Andes on which the lone American airman in Peru had once gambled his life, and won big. W.S.

Every airplane generates a wake while in flight. Originally believed to be "prop wash" it was later discovered to be a pair of counter-rotating *vortices* trailing from the wing tips. As aircraft became larger and heavier, the intensity of the vortices began to pose problems for smaller aircraft. Some of today's jet aircraft, particularly the new (civil and military) jumbo jets, generate vortices with roll velocities *exceeding* the roll control capability of some aircraft. Furthermore, turbulence generated within the vortices can cause structural damage to aircraft if encountered at close range.

FAA's Air Traffic Service is applying IFR separation standards designed to preclude wake encounters, but in most VFR situations the pilot sets up his own separation from other aircraft. Since he alone controls his potential exposure to the trailing vortices of other aircraft, the pilot must be able to visualize the movement of disturbed air over the wing, and its relationship to lift.

Lift is caused by a pressure differential over the wing surfaces. The lowest pressure is near the center of the upper surface, which tends to draw the airflow over the top of the wing inward from the wing tip toward the fuselage. Similarly, the highest pressure, near the center of the lower surface, makes the airflow under the wing bend outward in an effort to equalize the pressure.

The resulting circulation and the downwash effect of the airflow over the wing causes the air leaving each trailing edge to form a vortex sheet which rolls itself up into a swirling spiral of air aft of the wing tips. After the roll-up is completed, the wake consists of two counter-rotating vortices. On modern swept-wing aircraft, the roll-up process is well underway even before the flow leaves the wing tips.

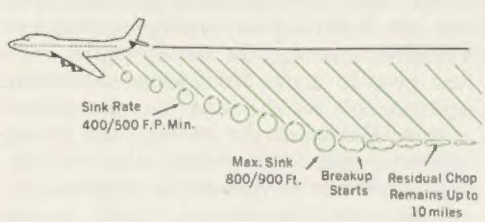
Vortex strength depends mostly on the weight, speed and shape of the wing of the generating aircraft. Vortex characteristics can also be changed by extension of flaps and other wing configuring devices as well as by a change in speed. However, the basic factor is weight, and the vortex strength increases with increases in weight and span loading. During a recent test, vortex tangential velocities were recorded at 150 feet per second or about 90 knots. The greatest vortex strength occurs when the generating aircraft is HEAVY, CLEAN and SLOW.

A serious wake turbulence encounter could result in structural damage, but the primary hazard is loss of control because of induced roll. During flight tests planes which were flown directly up the core of a vortex tended to roll with that vortex. The capability of counteracting this roll depends on the span and counter control responsiveness of the encountering aircraft. With larger aircraft, where the wing span and ailerons extend beyond the vortex, counter control is usually effective and the induced roll is minimal. If the ailerons of a short span aircraft were entirely within the vortex, its counter control effectiveness would be substantially reduced. *If the vortex strength were to exceed the counter control capability of the encountering aircraft, the induced roll could not be stopped.* The significant factor in induced roll is the relative span of the encountering aircraft. The wake of the large jet requires the respect of all pilots, but operators of short span aircraft must be especially alert to vortex situations even though their aircraft is one of the high performance types.

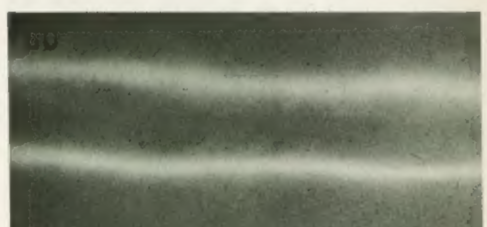
Trailing vortex wakes have certain characteristics which a pilot can use in visualizing the location and avoiding it. Vortex generation starts with *rotation* when the nose wheel lifts off and ends when the nose wheel touches down on landing.

The vortex circulation is outward, upward and around the wing tip when viewed from either ahead or behind the aircraft. Tests with heavy aircraft have shown that the diameter of the vortex core ranges from 25 to 50 feet, but the field of influence is larger. The vortices stay close together (about ¾ of the wingspan) until dissipation. Thus if persistent vortex turbulence is encountered, a slight lateral change in flight path will often avoid it.

The vortices from heavy jets start to sink immediately—about 400 to 500 feet per minute—and tend to level off about 800 to 900 feet below the generator's flight path. Vortex strength diminishes with time and distance behind the generating aircraft. Atmospheric turbulence hastens breakup; residual choppiness remains after breakup. Pilots should fly at or above the heavy jet's flight path, altering course as necessary to avoid the area behind and below the generating aircraft.



Deterioration of wingtip vortices of Boeing 747 is clearly illustrated in this series of photos taken at 0, 50, and 100 seconds after the jumbo jet airliner flew overhead at 4,900 feet. Smoke generators make vortices visible.



Wind-tunnel demonstration shows pattern of wingtip vor

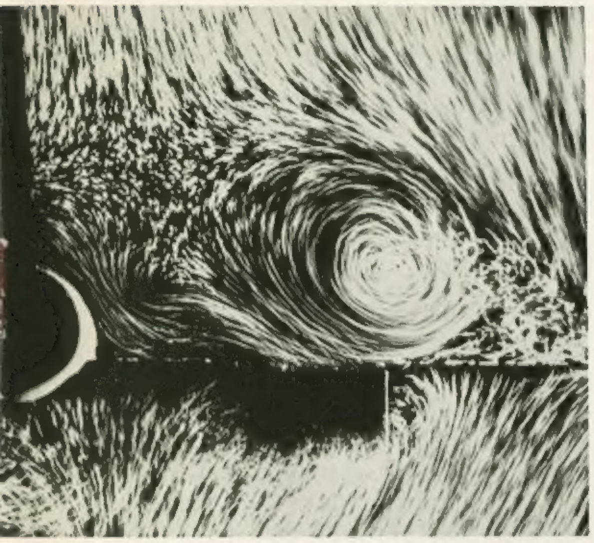
SCRAMB

Who has seen the wind? . . . a p
the minds of leading scientists

When the vortices sink into ground effect, they move laterally outward over the ground at about 5 knots.

A cross-wind on the ground could cause the upwind vortex to remain on the runway or hasten the drift of the downwind vortex toward a parallel runway. Also a tailwind would move the vortices of the preceding plane forward into the touchdown zone of the runway. Pilots should be alert to heavy jets upwind from their flight path.

A wake encounter is not always hazardous. It may be only two bumps, one for each vortex, as the wake is crossed, with



tices of the Concorde, Anglo-French supersonic airliner.

LED AIR

oetic question that is occupying
and flyers, with good reason.

varying severity depending upon the direction of the encounter, distance from the generating aircraft and point of vortex encounter. The probability of buffeting and induced roll increases when the encountering aircraft's heading is aligned with the vortex trail. *Avoid encounters below and behind the generating aircraft, especially at low altitudes where even a momentary wake encounter could be hazardous.*

Pilots should be particularly alert to calm wind conditions and situations where the vortices:

Remain in the touchdown area.

Drift downwind to a parallel runway.

Sink into takeoff or landing path of a crossing runway.

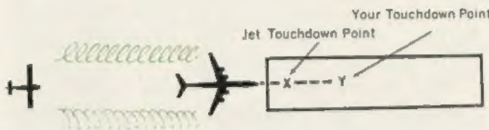
Sink into the traffic patterns for other airports.

Sink into the flight path of VFR flights operating at the hemispheric altitude 500 feet below.

Under certain conditions, airport traffic controllers apply procedures for separating other aircraft from large turbojets. They will also provide VFR aircraft with whom they are in communication and which in the tower's opinion may be adversely affected by potential wake turbulence from a heavy jet, the position, altitude and direction of flight of the heavy jet followed by the phrase "Caution—wake turbulence". Thereafter, the VFR pilot is expected to adjust his operations and flight path as necessary to preclude serious wake encounters.

The following vortex avoidance procedures are recommended for the situations shown.

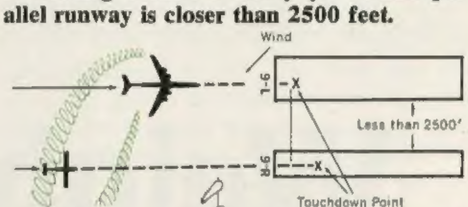
1. Landing behind a heavy jet—same runway.



TOWER: "Number two to land, following Lockheed C5A on final. Caution wake turbulence."

PILOT: Stay at or above the heavy jet's final approach flight path—note his touchdown point—land beyond it.

2. Landing behind a heavy jet—when parallel runway is closer than 2500 feet.



TOWER: "Cleared to land Runway 9-R. Caution wake turbulence—B-747 on final 9-L"

PILOT: Note wind for possible vortex drift to your runway—request upwind runway if practical. Stay at or above the heavy jet's final approach flight path. Note his touchdown point—land beyond a point abeam his touchdown point.

3. Landing behind a heavy jet landing on a crossing runway.

TOWER: "Cleared to land Runway 9. Caution wake turbulence. Boeing 747 crossing threshold landing Runway 36."

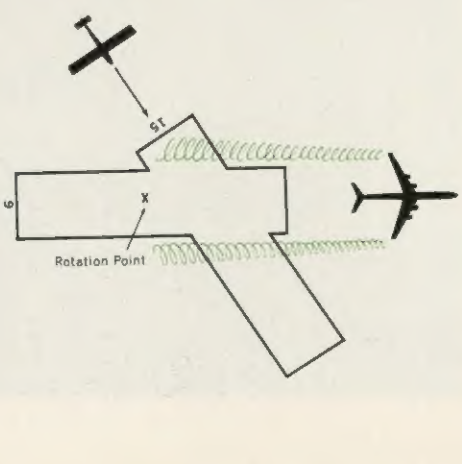
PILOT: Cross *above* the heavy jet's flight path.

4. Landing behind a departing heavy jet on the same runway.

TOWER: "Cleared to land—caution wake turbulence—C-141 departing."

PILOT: Note heavy jet's rotation point—land well before rotation point.

5. Landing behind a heavy jet departing on a crossing runway.

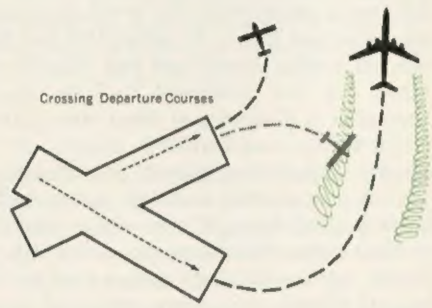


TOWER: "Cleared to land Runway 15—Caution wake turbulence—C-141 departing Runway 09."

Note: The ATC tower will withhold clearance to land for a prescribed time period where an inflight crossing of paths is evident.

PILOT: Note heavy jet's rotation point—if past the intersection—continue the approach—land prior to the intersection. If heavy jet rotates prior to the intersection, avoid flight below the heavy jet's flight path. Abandon the approach unless a landing is assured well before reaching the intersection.

6. Departing behind a heavy jet.



TOWER: The ATC tower will withold clearance for a prescribed time period for takeoffs on the same runway, a parallel runway separated by less than 2500 feet, and any other situation where an inflight crossing of courses is evident.

PILOT: Rotate prior to heavy jet's rotation point, continue climb above heavy jet's climb path until turning clear of his wake. Avoid subsequent headings which will cross below and behind a heavy jet. Be alert for any takeoff situation which could lead to a vortex encounter.

7. Intersection takeoffs, same runway.

TOWER: Towers will withhold intersection takeoff clearance for a prescribed time period behind a large turbojet aircraft on the same runway.

PILOT: Be alert to adjacent heavy jet operations particularly upwind of your runway. If intersection takeoff clearance is received, avoid subsequent heading which will cross below a heavy jet's path.

8. Enroute VFR—(altitude plus 500')

TOWER: No clearance involved.

PILOT: Avoid flight below and behind a heavy jet's path. If a heavy jet is observed above you on same track (same or opposite direction) adjust your position laterally, preferably upwind.

9. Helicopters. A hovering helicopter generates a downwash from its main rotor(s) similar to the prop blast of a conventional aircraft. In forward flight, this energy is transformed into a pair of trailing vortices similar to wing-tip vortices. Pilots of small airplanes and helicopters should avoid both

(Please turn to page 13)

Weight Watching

Overweight airplanes, like overweight people, are flying in the face of ominous statistics

The sun was just beginning to fade from the California sky as the red and white Comanche took off from Stockton. With the pilot, a 34-year old automobile salesman from Modesto, were five friends enjoying an after-work jaunt in the nearly new light twin.

Within ten minutes after takeoff, all six persons were dead; the aircraft lay crumpled and torn in a vineyard, its right wing embedded in a walnut tree, the other resting in a small irrigation canal.

Witnesses were uniform in their reports. They first heard erratic engine sounds, then saw the airplane begin a steep right bank in a nose-low attitude. They all agreed that at about 2,000 feet the plane went into a spin with an even steeper nose-down position. The Comanche made about five revolutions, turning faster and faster. At about 500 feet there was an engine surge and the aircraft flattened out, but continued to spin. Shortly thereafter it disappeared from view and the muffled but unmistakable crunch of the ground impact was heard. Just before the walnut tree severed the right wing, the aircraft slashed through low voltage wires.

No weather problems, no traffic, no evidence of mechanical failure—what happened? Clearly, the pilot, who had logged 89 hours in the aircraft, had lost control of the airplane—but why?

When all the data of the National Transportation Safety Board and the Federal Aviation Administration investigation were analyzed, the accident was listed as a "Stall-Spin." The probable causes were that the pilot "failed to maintain flying speed" and "improperly operated the flight controls." Under the heading of "Factors" (which contributed to the cause) was the key that explained the reason for this particular mishap: "improperly loaded aircraft . . ." *The aircraft was 163 lbs. over gross and the center of gravity was approximately* one inch aft *of the rearward limit of the C.G.* at the time of the accident.

Was it the extra passenger or the extra inch that brought about this tragic accident? Or both?

The investigation showed that the airplane at takeoff was 187 lbs. over maximum gross; and the center of gravity of the overloaded plane was 0.9 inches aft of the prescribed limits. As the flight progressed, 24 lbs. of fuel were burned off, but this usage served to increase the center of gravity imbalance to 1.01 inches, since most of the passenger weight lay behind the fuel. Most of the passengers were relatively lightweight, but one person weighing 200 lbs. occupied a rear seat. The flying distance from Stockton to the destination airport, Modesto, was only about 25 miles, but the fuel tanks were carrying 54 gallons at takeoff (324 lbs.) There was no baggage. Yet the aircraft was loaded unsafely, as a simple calculation would have shown.

A glance at Table I (page 11) shows that the greatest single factor affecting rearward extension of the center of gravity is the passenger weight in the rear seats. Even if the fuel load had been reduced to bring the gross weight within takeoff limits, the aircraft would have been unsafe to operate because the center of gravity would have shifted still further aft—unless the passenger configuration had been altered.

For many pilots the terms "arm" and "moment" are tiresome and meaningless abstractions, and they are determined not to let them interfere with the pleasures of flying. They assume that if you do not carry more people than you have seats, and if you do not cram the baggage compartment so full that the door will not shut, you have not overloaded the airplane. Because of designed flexibility there are many light aircraft on the market today that, when fully fueled, will not safely carry as many persons as there are seats on board—even with no baggage at all.

There are at least half a dozen popular two-place trainers with a useful load of about 575 lbs. This sounds like a good deal of weight until you begin to add up the weight of 30 gallons of fuel at 6 lbs. per gallon, plus some 5 lbs. of books and training aids, plus a student and instructor weighing, say, 180 lbs. and 175 lbs. respectively. If the student, upon receiving his private ticket, takes up a 210-lb. passenger in place of the instructor, he will be overloaded and apt to find himself in big trouble just getting off of the ground. On a very light plane, a few pounds over the legal limit can transform a flying tiger into a sick pussycat.

The problem is not limited to single-engine aircraft. There are several light twins which can be flown safely with all seats filled only if the average passenger weight is *below* 170 lbs., unless restrictions are placed on fuel and baggage loading. Weight and balance

can also be critical factors in engine-out performance of a twin.

Furthermore, although an airplane is certificated for a given maximum gross takeoff weight, this is no assurance that it will take off safely with this load under *all* conditions. Operating performance will be affected by high elevations, temperatures, high humidity, runway surface and obstacles to flight.

Exceeding the certificated weight limit reduces the flying capability of your airplane in almost all respects. You will need a higher takeoff speed and a longer takeoff run than usual. Your angle and rate of climb are reduced, and your maximum operating altitude lowered. You will cruise at a slower airspeed, and your maneuverability will not be as crisp as normal. You will stall at a higher speed, and you will have to land hotter than usual, with a longer landing roll. If your engine is ailing for any mechanical reason, or if you develop trouble with the controls, the seriousness of your problem will be greatly intensified by an overweight airplane. Overloading an airplane is like carrying a lead weight in your parachute pack. If you have an emergency, you will become very much aware of it.

It is a common (but mistaken) belief among pilots of small aircraft that if you do not exceed the maximum gross weight you cannot create an out-of-balance condition. This may have been true at one time, with respect to certain stubby aircraft, but it certainly does not apply to the modern "long-bodied" light plane.

An out-of-balance aircraft is one whose center of gravity has been moved further forward or aft than the allowable limit established by the manufacturer's design. The center of gravity may be thought of as a point from which, if the airplane were suspended by a cable, it would lie perfectly horizontal. (In most light aircraft, this point is located near the root of the wing, at empty weight.) Obviously the center of gravity's position will vary according to the plane loading, the number of seats occupied, weight of each passenger, the weight and location of baggage or cargo and fuel.

Every aircraft is designed to respond to controls satisfactorily and to retain its inherent stability so long as the center of gravity remains within the specified fore and aft range, which bears an important relation to the *center of pressure*—the point on the wing through which all lift forces are considered to act. The fact that the center of gravity is forward of the lift point allows the airplane with power off to nose down, unless some control force is exerted. With power, lift and gravity are balanced and the airplane is stable in level flight.

If the center of gravity (through improper loading) is moved too far forward from the lift point, however, a nose-heavy airplane will be the result. With such a condition you would require excess aft trim and back-pressure to keep the airplane flying and the drag would cost you airspeed and fuel. You might not be able to rotate successfully on takeoff; or, in approaching to land, you might not be able to pull the nose up enough to avoid wheelbarrowing.

If the center of gravity is pushed aft of the normal limit, which could bring it aft of the lift point, you would have a tail-heavy airplane. You would have to carry excessive forward trim in flight and considerable forward pressure on the wheel, again with resultant loss of flying efficiency. Your airplane might take off readily but persistently attempt to stall; and once stalled, it might resist all efforts to get the nose down before dropping into a spin—from which it might not be recovered. Recall the accident described in the beginning of this article: 1.01 inches aft of the C.G. limits was enough of an excess to contribute to the death of six persons.

Once an unbalanced aircraft begins to assume an unsafe attitude, the pilot may find that his control range is simply not enough to overcome the imbalance, and the aircraft will move further into the stall or dive in spite of anything he can do. At best, he will find that compensating for an imbalance means slowing the aircraft with excessive use of trim or wheel pressure—which can be dangerously fatiguing on a long flight.

Lateral imbalance is usually caused by negligence on the part of the pilot who fails to switch from one wingtank to the other until the first runs dry. Even though the weight differential may be slight the leverage given to that weight by the length of the wing may give the pilot aileron control problems, especially if he is flying IFR, with no visible horizon. Switching from one outboard tank to the other after using about one-third of the tank will minimize lateral imbalance. The inboard tanks can be switched less frequently.

The time to take all matters of weight and balance into consideration including fuel utilization is during the pre-flight planning for the trip. In a small aircraft, weight and balance calculations can be quite simple, but they are just as critical to safety in a two-place trainer as they are in a four-engine jet. Unless the pilot is thoroughly familiar with his aircraft, and loads are unquestionably within approved limits, a pencil and paper calculation is a must: most flying mistakes are made "in the head."

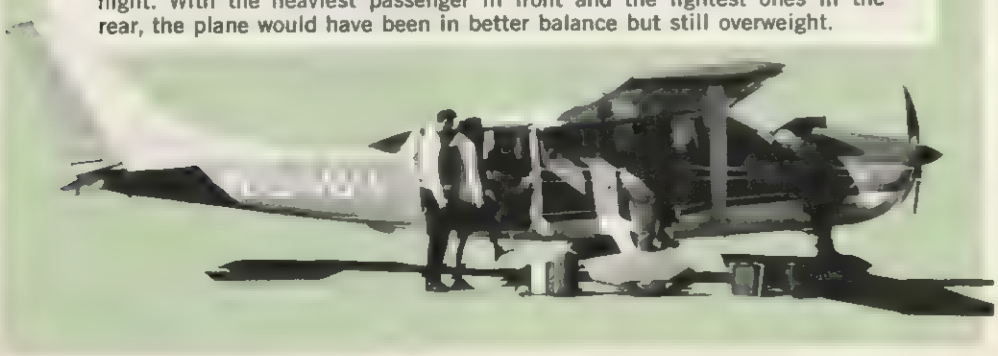
You never know when inflight conditions might call for optimum airplane performance, but you can safely predict that you will not get this performance from an improperly loaded aircraft. Go by the book.

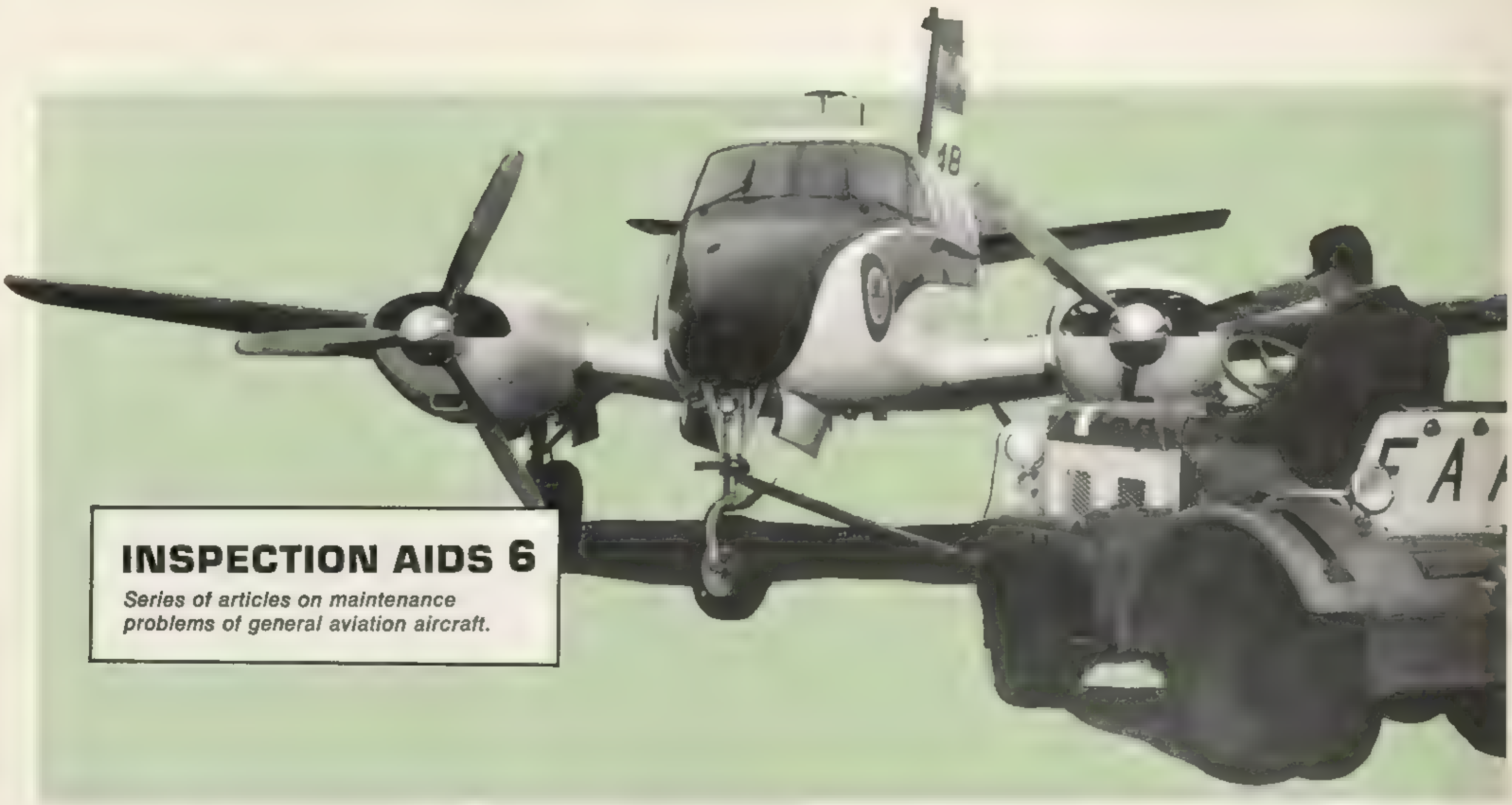
(The second half of this article, appearing in the April issue, will discuss the basic elements of weight and balance calculation and present a simplified approach to on-the-spot load analysis.)

Table I

	Weight (lbs.)	Arm (inches)	Moment (lb./inches)
Empty weight (incl. oil)	2,446	83.1	203,262.6
Fuel inboard (40 gals. @6 lbs. per gallon)	240	90.0	21,600.0
Fuel outboard (14 gals.)	84	95.0	7,980.0
Front seat occupants (2)	362	85.0	30,770.0
Center " " (2)	305	120.5	36,752.5
Rear " (2)	350	148.0	51,800.0
	3,787	92.9	352,165.1
Allowable gross takeoff	3,600	Center of gravity 92.9 in.	
Excess	187	C.g. limits 86.5-92 in.	

Take off weight and balance data of the Twin Comanche on the ill-fated flight. With the heaviest passenger in front and the lightest ones in the rear, the plane would have been in better balance but still overweight.





INSPECTION AIDS 6

Series of articles on maintenance problems of general aviation aircraft.

LEADING by the NOSE

Airplanes, like prize bulls, do not like to be jerked about by the nose. Easy on that tow bar.

The steerable nose wheel is one of the most useful appendages of the modern aircraft: it is also one of the most vulnerable to abuse. Many pilots who take great pains to treat their nose gear gently when landing, taxiing or taking off are sometimes surprised to encounter a steering failure after only a relatively few hours of flight time.

The failure may be traced to improper towing techniques or general carelessness in ground handling. Since steerable nose wheels are linked to the rudder control, failure to remove rudder locks before towing the aircraft can easily cause damage to the wheel and the control linkage. Another type of damage occurs when the aircraft is towed while the parking brake (on the main gear) is locked. Trying to turn a plane under these conditions invariably places excess strain on the nose wheel.

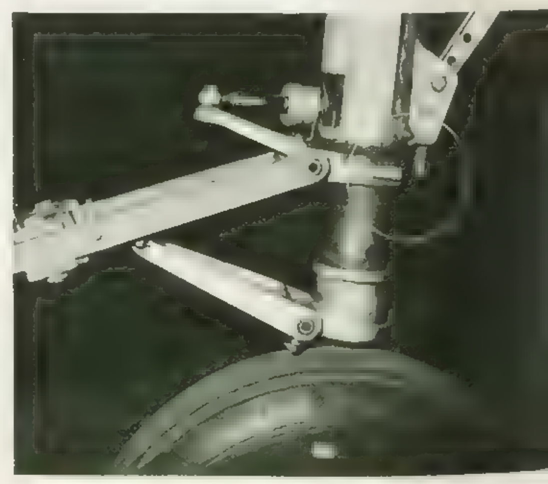
Aircraft are commonly moved about the flight ramp or hangar by means of a tow bar drawn by a light tractor and attached directly to the nose wheel. Very few wheels can be (or are designed to be) turned more than about 45 degrees from center; the turning radius is usually marked on the gear and stops are provided to prevent the limit from being exceeded. But the leverage on even a fairly short tow bar is strong enough to override the stops if the tractor tugs strongly enough. Result: a nose wheel that may not steer straight with the rudder, may wobble on the runway, may not retract, may even drop off in the air.

Pilots are not always in a position to oversee the towing of their aircraft, and most maintenance crews are thoroughly responsible. But it would not be a bad principle for the pilot to stand by briefly when he turns his aircraft over to an unfamiliar ground crew. It also is good insurance for him to make certain the turning stops are clearly visible, and to make sure that he has not absentmindedly inserted the rudder lock before leaving the cockpit, when he knows his aircraft is likely to be towed. If he leaves it tied down securely, he may want to release the parking brake as well.

As a final precaution, checking the alignment of the nose wheel with the rudder during preflight is a good habit to get into. Once you start gunning your bird down the runway, it is too easy to decide that the nose is wavering off the centerline because the paving is slick or the crosswind severe—and by that time it may be too late to prevent an accident.

(Official FAA Inspection Reports are available from the Superintendent of Documents, Washington, D.C. 20402. Domestic subscription is $3.00, foreign $3.75.) ■

Posted turn limits (above) are usually reinforced by turn stops (encircled, below). Overriding the turn stops could affect the nose wheel-rudder steering alignment. Check the stops occasionally for wear.



Scrambled Air

(continued from page 9)

the vortices and downwash of a heavy helicopter.

10. Thrust stream turbulence. During ground operations, jet engine blast requires caution. Their operating procedures call for careful use of power during ground operations. Nevertheless, the blasts can cause damage and upsets if encountered at close range.

In the interest of exchanging all available information on turbulence in its many forms, experts on the subject from throughout the world have been invited to an FAA-sponsored Turbulence Symposium on March 22-24 at the Marriott Twin Bridges Hotel in Washington, D. C. Anyone interested may register to attend by contacting FAA, Washington, D.C. 20590, attention FS-60. Findings will be reported in this magazine.

AC-90-23B, "Wake Turbulence," just published by FAA's Flight Standards Service, is available free on request from DOT Distribution Unit, TAD 484.3, Washington, D. C. 20590. ■

Highlights of the Turbulence Symposium Agenda

Monday, March 22

- Film Highlights 1970 Wake Turbulence Test Program
- John H. Shaffer, Administrator, FAA
- Aircraft Configuration Effects on Wake Turbulence—Dr. John Olsen, Boeing
- Turbulence Related Accidents, World-wide Synopsis — D. D. Thomas

Tuesday, March 23

- Review of Clear Air Turbulence Program—Dr. Arnold Goldburg, Boeing
- Thunderstorms and CAT—Captain J. B. Clark, Allied Pilots Association
- Thunderstorms — Turbulence — G. T. Lee, National Severe Storms Laboratory
- Wind Shear—Captain W. Melvin, Delta Air Lines

Wednesday, March 24

- Transmission of Turbulence Data to the Cockpit—NOAA
- PIREPS and Enroute ATIS in the ATC System—FAA
- Turbulence Information in the Weather System—Frank Burnett, NOAA

Pilot BRIEFS

■ WIDE BAND COLORING. A new FAA advisory circular on obstruction marking and lighting recommends an increase in the width of the orange and white bands painted on towers, smokestacks and similar structures. Tests have shown wider bands are more conspicuous from the air and afford pilots better warning. AC 707/7460-1 CHG 2 is free on request from the DOT Distribution Unit, TAD 484.3, Washington, D.C. 20590.

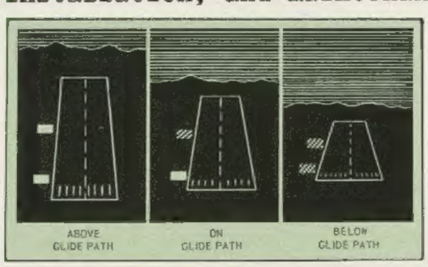
■ IFR RULE CLARIFIED. The altitude, climb and descent portions of FAR Part 91.127, concerning operating procedures following two-way radio failure while IFR, have been rewritten for clarification (but not changed). Inquiries indicated confusion as to whether a pilot, who has lost radio contact during an IFR flight and who has climbed to an MEA above the altitude assigned by ATC, should maintain the higher altitude for the balance of the flight, or descend back to the assigned level or lower MEA.

As rewritten, the rule clearly states that, for each segment of the IFR flight, the proper altitude is the highest of the following: (1) altitude last assigned; (2) the MEA; or (3) the altitude the pilot has been told to "expect in a further clearance". After climbing to an altitude appropriate for one segment the pilot would properly descend, if necessary, to satisfy the rule of a later flight segment.

■ IFR TAKEOFF MINIMUMS FOR PRIVATE AIRCRAFT? FAA is studying comments on a Notice of Proposed Rule Making (Docket No. 1075; Notice 71-1) which would extend the rule governing IFR takeoff weather minimums to all aircraft. The present rule requires only that commercial operators be bound by takeoff minimums. Several recent accidents involving private aircraft suggest that the rule should cover all IFR operations.

■ TEMPORARY FLIGHT RESTRICTIONS. New FAA rule, effective March 1, 1971, prohibits unnecessary flying in the area of any incident or event which might generate so much interest that an unsafe traffic condition would develop in the air. FAA feels that on some occasions, such as civil disturbances or major sporting events, the temporary closing of airspace may be the only way to avoid a hazardous situation. Pilots will be advised through Notices to Airmen.

■ UTILITY AIRPORT LIGHTING. Standards for the design, installation, and maintenance of medium intensity runway lighting systems (MIRL), and visual approach slope indicators for utility airports are described in a revised FAA advisory circular. AC 150/5340-16B "Medium Intensity Runway Lighting System and Visual Approach Slope Indicators for Utility Airports" cancels AC 150/5340-16A. Free on request from the Department of Transportation Distribution Unit, TAD-484.3, Washington, D.C. 20590.



ACCIDENTS, FATALITIES, RATES IN U.S. GENERAL AVIATION

1960-1970

Year	Accidents Total	Accidents Fatal	Fatalities	Aircraft Hours Flown (000)	Aircraft Miles Flown (000)	ACCIDENT RATES Per 100,000 Aircraft Hours Flown Total	Per 100,000 Aircraft Hours Flown Fatal	Per Million Aircraft Miles Flown Total	Per Million Aircraft Miles Flown Fatal
1960........	4,793	429	787	13,121	1,768,704	36.5	3.27	2.71	0.243
1961........	4,625	426	761	13,602	1,857,946	34.0	3.13	2.49	0.229
1962........	4,840	430	857	14,500	1,964,586	33.4	2.97	2.46	0.219
1963........	4,690	482	893	15,106	2,048,574	31.0	3.19	2.29	0.235
1964........	5,069	526	1,083	15,738	2,180,818	32.2	3.34	2.32	0.241
1965........	5,196	538	1,029	16,733	2,562,380	31.1	3.22	2.03	0.210
1966........	5,712	573	1,149	21,023	3,336,138	27.2	2.73	1.71	0.172
1967........	6,115	603	1,228	22,153	3,439,964	27.6	2.72	1.78	0.175
1968[b]......	4,968[a]	692	1,399	24,053	3,740,000	20.6	2.86	1.33	0.184
1969........	4,767	647	1,495	25,351	3,773,000(est)	18.8	2.55	1.26	0.171
1970(prelim)	4,927	621	1,270	25,500(est)	3,927,000(est)	19.3	2.44	1.25	0.158

[a] Commencing January 1, 1968, the definition of "substantial damage" was changed, resulting in fewer incidents being classified as accidents. Care should be used in comparing with similar data for prior years.

[b] 3 suicide/sabotage accidents are included in all computations except rates.

SOURCE—NATIONAL TRANSPORTATION SAFETY BOARD

Commercial and General Aviation Accident Rate Down

Commercial air travel in 1970 chalked up its safest year in the U.S. since 1938 when Federal accident records were begun. Not a single passenger lost his life on a scheduled domestic flight in 1970. Internationally one recent accident at St. Thomas (San Juan) resulted in two passenger fatalities.

General aviation also had fewer fatal accidents in 1970 than in the previous year. Preliminary statistics indicate that there were 4,927 total accidents, 621 fatal accidents, and 1,270 fatalities in private flying, for an estimated 25,500,000 hours flown. In 1969 fatalities numbered 1,495.

Changes In Pilot Schooling, Certification Under Review

Plans for upgrading requirements for both the private pilot and commercial operators certificate and for instrument ratings are now under active consideration by FAA. The agency is convinced that greater emphasis on early practical training in the use of flight navigation instruments and broader experience in more sophisticated aircraft will reduce accidents in general aviation. Although still in the formative stage, revisions are expected along the following lines:

Private pilots. A higher level of competency in cross-country flying may be established. In particular, greater proficiency in the use of radio navigation may be required.

Instrument rating. Ability to fly the three standard types of instrument approaches (VOR, ADF and ILS) should be demonstrated, not just one, as in the present rule.

Commercial pilots. They should have some training in aircraft with controllable landing gear, flaps and propellers, regardless of the type of aircraft they normally fly.

Changes affecting flight and ground schools and flight instruction are also under consideration. FAA is proposing that schools submit their training manuals to the agency for approval, and the agency may require applicants for certificates or ratings to complete formal ground school training, or directed home study, before taking the written examination. The present rule requires only that the pilot pass the examination.

To help standardize flight training across the nation, a standard syllabus for flight instructors may be issued.

FAA Administrator John H. Shaffer regards improved pilot competency as basic to the continued growth of general aviation.

Reduction in Aircraft Use Tax

An amendment to the Airport and Airway Revenue Act of 1970 will exempt the first 2,500 pounds of non-jet aircraft from the two cents per pound tax. As originally written, annual tax for the use of civil aircraft was $25, plus two cents per pound of maximum certificated takeoff weight.

Under the new amendment all aircraft of 2,500 pounds or less will be taxed $25 only. Heavier aircraft (non-jet) will pay $25 plus two cents per pound of maximum takeoff weight over 2,500 pounds. The amendment will take effect July 1, 1971.

Jets will still be taxed at the rate of 3½ cents per pound, plus the base fee of $25.

Twenty-Seven Grants Allocated to Help General Aviation Airports

Twenty-seven airport construction or improvement grant allocations for airports serving general aviation exclusively have been approved by the Federal Aviation Administration under the new Airport Development Aid Program (ADAP) which began on July 1, 1970. Grants have been allocated for an overall total of 68 airports, involving a cost of about $80 million.

More than 500 requests for grants totalling about $375 million have been received by FAA. Additional requests both for airport construction funds and airport planning grants are being received. Construction grants must be matched on a 50-50 basis by airport sponsors whereas Federal participation in planning grants may be as much as two-thirds of the planning costs.

FAA has issued a Notice of Proposed Rule Making which would align the FAR Parts 151 and 152 with the provisions of the ADAP and Planning Grant Program contained in the Airport and Airway Development Act of 1970.

Washington TCA Plan Now Mandatory

The voluntary Washington Terminal Control Area (TCA) plan at Washington National/Andrews Air Force Base became mandatory on February 4, 1971. One minor airspace change involves raising the TCA ceiling from 6,500 feet to 7,000 feet. Regulatory details for use of this terminal area are given in the current Airman's Information Manual and a special graphic notice which has been distributed to local airports. Further assistance is available at all Flight Service Stations.

Washington TCA is the third in operation thus far; others are at Chicago O'Hare and Atlanta Municipal Airports.

TWO-PLACE STOL New McCulloch Gyroplane has been FAA certificated. In contrast to helicopter, gyropane uses a free-wheeling rotor, has a 180 h.p. pusher prop. Aircraft cruises at 105 mph with a 200 mile range, lands at about 25 mph on a 100 foot runway.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Pilot's Eye View

I would like to know whether the FARs specify the amount of visibility a pilot should have. I was appalled to see the tiny windshield that the Boeing 747 sports. Only a small fraction of the potential field of view is realized for the pilot and copilot. A recent picture of the Lockheed Tri-Star showed a much more generous windshield in a better location. The pilots' visibility must be three or four times as good.

Marvin S. Weinreb, M.D.
Castro Valley, Calif.

Part 25 of the FARs states in part" . . . Each pilot compartment must be arranged to give the pilots a sufficiently extensive, clear, and undistorted view to enable them to safely perform any maneuvers within the operating limitations of the airplane including taxiing, takeoff, approach, and landing . . ." These requirements are supplemented by FAA policy material published in paragraph 4b.351 of Civil Aeronautics Manual Part 4b.

The 747 has been certificated under the above requirements. The impression of the photo may be a little misleading. A special device in the 747 enables the pilot to be sure he has adjusted his position for an adequate view as required by the regulations. The Lockheed 1011 has not yet started its FAA certification flight test program, so the cockpit visibility provided has not been evaluated.

• Copter Help Wanted

We at ROTOR & WING magazine receive a great many letters from Army copter pilots looking for positions after they get out of the service—like the writer whose letter appeared in the Forum, FAA AVIATION NEWS, October 1970.

Occasionally, we can refer these people to corporations looking for pilots but in every case, we do refer them to the Helicopter Association of America and some of the major manufacturers who express an interest in assisting these men.

Bell Helicopter has set up a department to handle just such requests.

Jerry R. Constantino
ROTOR & WING
News Plaza, Peoria, Ill.

Thanks for the information. Returning pilots, please note.

• Logbook Dilemma

Recently I transferred my time from my original logbook to one of better design. I want to make all my instructors' signatures legal in the new logbook, but I cannot seem to find an approved way of doing it. The FAA District Office has said there is no way to legally transfer these signatures and that I should keep the original logbook. Can you tell me if there is a legal way to transfer signatures?

John D. Frenzel
Oakland, California

The signatures may not be legally transferred, but the names of the instructors may be printed in a new logbook and a notary public may certify that these new entries are the same as shown in the original. Retain original logbook for documentary proof of flight time.

• Everyman His Own File Clerk

Has consideration been given to distributing Instrument Approach Procedure Charts in order of airport name, rather than in order of city name, as is now done?

Airports are shown by name rather than location on all Low Altitude Enroute Charts. You may have a long search through the plates to find the approach, after you have picked out the airport. In an emergency situation, this delay might be disastrous.

Michael F. Armstrong
Rochester, New York

Consideration has been given to this question. You will notice that both the airport name and the city and state are listed on the Instrument Approach Chart, top and bottom. Since both are listed, it now becomes a matter of user choice how he files them in his binder. He can arrange them alphabetically by airport name within state or alphabetically by city within state. If he prefers, he can arrange them alphabetically by airport name or by city name, state notwithstanding. With this flexibility you can arrange the charts in the manner that is best for you.

• Calling Northrop Alumni

About 18 percent of the mechanics employed by the commercial airlines are graduates of Northrop Institute's School of Aviation Maintenance. We would like to hear from our graduates to find out where they are employed.

Gary L. Godbey
1155 West Arbor Vitae St.
Inglewood, Calif. 90306

Your alma mater calls, mechanics.

• Snarking the Traffic Area

In the December 1970/January 1971 issue the article "Follow That Snark" states that an Airport Traffic Area forms ". . . a circle with a five mile radius from the airport, and extending up to but not including 3,000 feet above the ground." I have been under the impression that the altitude limit was 2,000 feet above the surface. Are there changes in the FARs?

Daniel R. Sutton
Wilmington, Delaware

Your eyes are very sharp, like those of several others who wrote in, but we were in a position to enjoy foresight. The article anticipated a change in Part 1 (Abbreviations and Definitions) and Part 91 (General Operating Rules) of the Federal Aviation Regulations, which raised the ceiling of the Airport Traffic Area to ". . . up to but not including 3,000 feet above the elevation of the airport." The effective date was February 4, 1971. Pilots will be advised via NOTAMs and a change in AIM.

Other readers have pointed out that the chart caption should have described weather minimums for controlled airspace as "more stringent" (than for uncontrolled airspace) rather than "lower."

• Hard Hearted Hanna

Further to your correspondents' comments in "Forum" on the first women to make flights in jet aircraft (FAA AVIATION NEWS, September 1970), it might be of interest that the first flights in reaction-propelled aeroplanes, although admittedly not under power at the time, were made by the celebrated German woman pilot Hanna Reisch in both the rocket-propelled Messerschmitt 163 and the pulse jet-propelled Fiessler Fi 103, more popularly known as the Flying Bomb.

Miss Reisch made gliding flights in both aircraft from airborne launches: in the rocket-propelled tailless Komet Interceptor Fighter and in the Flying Bomb, launched from beneath the wing of a Heinkel 111.

In the light of later history it is probably a good thing for Miss Reisch, who is still alive, that authority refused to let her make powered flights in either aircraft.

John H. Blake
London, England

True enough. Miss Reisch, according to her own statement, also invented the idea of the suicide pilot before the Japanese but was restrained from demonstrating her devotion to the Nazi cause by her Fuhrer. Apparently she managed to escape from Hitler's last stand bunker hours before the end, was later captured by Allied forces and served time as a war criminal.

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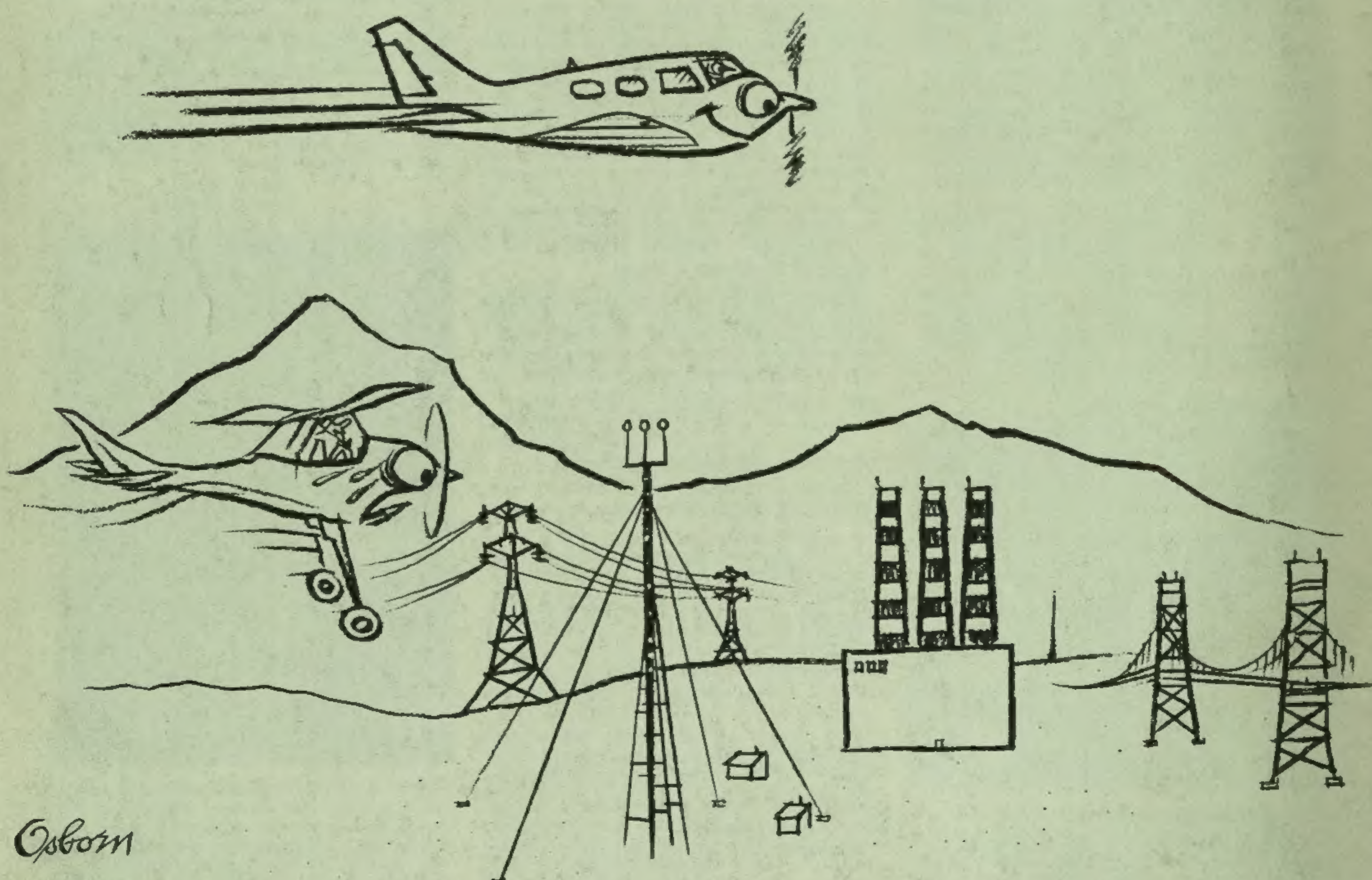

Can spoil your appearance

Suggested by Betty S. Smith
Winston-Salem, N.C.